REMARKS

Applicants thank the Examiner for the thorough Examination of the present application that is reflected in the Final Office Action dated December 26, 2001. In response, Applicants amend claims 37, 56, 62, and 63 of the application; marked up versions of the amended claims are attached hereto pursuant to 37 C.F.R. § 1.121(c)(ii). Amended claim 37 recites "independently filling each of the openings with a composition for the hole injecting and transporting layer using an ink-jet recording head, the composition comprising (1) a conductive material containing at least a lubricant, polyethylene dioxythiophene and polystyrene sulfonic acid, and (2) a solvent." Amended claim 56 recites "independently filling each of the openings with a composition for the hole injecting and transporting layer using an ink-jet recording head, the composition comprising at least a material for the hole injecting and transporting layer, a lubricant, and a polar solvent." Amended claim 62 recites "independently filling each of the openings with a composition for a hole injecting and transporting layer using an ink-jet recording head, the composition comprising (a) a conductive material containing at least a lubricant, polyethylene dioxythiophene and polystyrene sulfonic acid, and (b) a solvent." Amended claim 63 recites "independently filling each of the openings with a composition for a hole injecting and transporting layer using an ink-jet recording head, the composition comprising at least a material for the hole injecting and transporting layer, a lubricant, and a polar solvent."

In addition, new dependendent claims 64-67 have been added by this amendment. New dependent claims 64-67 depend from claims 37, 56, 62, and 63, respectively, and are supported throughout the specification, for example, at page 19, line 17 through page 20, line 2. New dependent claims 64-67 recite that "the lubricant is diethylene glycol."

Pursuant to this amendment, claims 37-54, 56, 58, and 62-67 are pending in the application. Reexamination and reconsideration of the application are respectfully requested.

The Examiner rejects claims 37-47, 52-53, 56, 58, 62, and 63 over U.S. Patent No. 5,725,407 to Liu *et al.* in view of U.S. Patent No. 5,965,281 to Cao and Jonas II. The Examiner also rejects claims 48-51 over the Liu patent in view of the Cao patent and Jonas II and further in view of U.S. Patent No. 5,667,572 to Taniguchi *et al.* The Examiner rejects claims 54 over the Liu patent in view of the Cao patent and Jonas II and further in view of Jonas I. The Examiner rejects claim 58 as obvious over U.S. Patent No. 6,004,483 to Jonas *et al.* (hereinafter "Jonas I") and over U.S. Patent No. 5,766,515 to Jonas *et al.* (hereinafter "Jonas II").

All of these rejections are respectfully traversed, and Applicants submit that all pending claims distinguish over the art of record and are in condition for allowance.

Claims 37, 56, 62 and 63

Independent claim 37 is directed to a method of manufacturing an organic EL element having a stacked structure including a hole injecting and transporting layer and a light-emitting layer formed within a partitioning member which is divided into individual pixel areas. The process includes:

> forming the partitioning member on the substrate, the partitioning member having openings corresponding to an anode;
>
> independently filling each of the openings with a composition for the hole injecting and transporting layer using an ink-jet recording head, the composition comprising (1) a conductive material containing at least **a lubricant**, polyethylene dioxythiophene and polystyrene sulfonic acid, and (2) a solvent; and
>
> drying the composition filled in the openings to form the hole injecting and transporting layer. (Emphasis added.)

Independent method claims 56, 62 and 63 recite similar steps.

Applicants respectfully submit that the cited references fail to teach or suggest such recitations of claims 37, 56, 62 and 63. For example, the cited references fail to teach or suggest a composition comprising "(1) a conductive material containing at least **a lubricant**, polyethylene dioxythiophene and polystyrene sulfonic acid, and (2) a solvent", as recited in claims 37 and 62, or a

composition comprising "at least a material for the hole injecting and transporting layer, a lubricant, and a polar solvent", as recited in claims 56 and 63. Accordingly, the rejection of claims 37, 56, 62 and 63, and the claims that depend therefrom should be withdrawn.

Claims 38-54 depend on claim 37. Thus, claims 38-54 are patentable over the Liu patent, the Cao patent, Jonas I, Jonas II, and the Taniguchi patent at least by virtue of their dependency from claim 37.

Claim 58

The Examiner rejects claim 58 as obvious over U.S. Patent No. 6,004,483 to Jonas *et al.* (hereinafter "Jonas I") and over U.S. Patent No. 5,766,515 to Jonas *et al.* (hereinafter "Jonas II").

Claim 58 is directed to composition used for forming a pattern formation of a hole injecting and transporting layer of an organic EL element using an ink-jet recording head. The composition comprises at least a material for a hole injecting and transporting layer and a polar solvent as a solvent with the composition having a viscosity between 1 to 20 cps and a surface tension of 20 to 70 dyne/cm. As explained in the specification, the viscosity and surface tension properties are important for its intended use with the ink-jet printing apparatus. Appropriate selection of these physical properties prolongs the flushing time for the ink-jet printing apparatus, produces more uniform dot density, and enhances the linearity of flight and facilitates control of the ink-jet apparatus.

The Jonas I and II patents describe a composition for a conductive coating that contains polythiophene and water as a solvent. The patents also provide a list of techniques for depositing the coating such as spraying, application by a doctor blade, dipping, application with roller application systems, etc. Nevertheless, the patents fail to teach or suggest the claimed physical properties of the composition such as the viscosity or surface tension. The Examiner acknowledges these deficiencies in each of the patents but alleges by taking Official Notice that factors such as the flowability of ink and its wetting ability on a surface are "well known parameters in coating processes." Moreover, the Examiner states that it would

have been obvious "to have optimized the viscosity and surface tension for the optimum flow and wetting properties." Applicants respectfully disagree.

Although the flowability and wetting ability of a solution may be controlled by the viscosity and surface tension of the solution. This, however, does not necessarily imply that a composition used for forming a hole injecting and transporting layer of an organic EL element and having a viscosity between 1 to 20 cps and a surface tension of 20 to 70 dyne/cm is obvious. Nor is it obvious to use such composition for manufacturing the organic EL element to improve light emission characteristics. What constitutes "optimized" properties typically varies among different compositions and/or under different applications. Namely, an "optimized" characteristic of a composition under a specific application may not apply for another condition. For example, the Examiner does not explain when taking the Official Notice, and the references do not teach or suggest, why the viscosity between 1 to 20 cps and the surface tension of 20 to 70 dyne/cm are "optimized" properties under such application. Accordingly, without supporting teaching or suggestion from the references, it is improper to jump the gap and conclude that a specific property (e.g., the viscosity between 1 to 20 cps or the surface tension of 20 to 70 dyne/cm) of a composition is an optimized characteristic of such composition under such application.

Moreover, even assuming for sake of argument that the Official Notice taken by the Examiner is technically correct, the Examiner still fails to explain why it is obvious to provide a composition having a viscosity between 1 and 20 cps and a surface tension of 20 to 70 dyne/cm to be used for the hole injecting and transporting layer. For example, the Examiner does not explain why the above-mentioned viscosity and surface tension properties are the optimized characteristics of the composition (why not other properties, such as the thermal conductivity, of the composition?) in making the hole injecting and transporting layer.

The present application, <u>not the prior art</u>, describes that using such a composition for the hole injecting and transporting layer will improve the manufacturing process and, thus, the light emission characteristics of the resultant

organic EL element. Applicants submit that this optimization of material and element design is the product of a prolonged experimentation by Applicants, and is therefore would not be obvious to one of ordinary skill in the art. See, e.g., Table 11 of the present application.

Applicants also note that Jonas I and II do not teach or suggest a hole injecting and transporting layer of an organic EL element made by a composition having a viscosity between 1 and 20 cps and a surface tension of 20 to 70 dyne/cm.

Thus, with respect to claim 58, none of the cited references teaches or suggests a composition having a viscosity between 1 to 20 cps and a surface tension of 20 to 70 dyne/cm for the hole injecting and transporting layer. Accordingly, claim 58 distinguishes over the cited references and is in condition for allowance.

New Dependent Claims 64-67

In addition, new dependendent claims 64-67 have been added by this amendment. New dependent claims 64-67 depend from claims 37, 56, 62, and 63, respectively, and are supported throughout the specification, for example, at page 19, line 17 through page 20, line 2. New dependent claims 64-67 recite that "the lubricant is **diethylene glycol**." Applicants respectfully submit that this recitation is not taught or suggested by the cited references. Accordingly, new claims 64-67 are also patentable over the cited references.

Applicants submit that the foregoing amendments place the application in condition for allowance and early, favorable action is respectfully solicited.

If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at the Los Angeles telephone number (213) 337-6793 to discuss the steps necessary for placing the application in condition for allowance.

If there are any fees due in connection with the filing of this response, please charge the fees to our Deposit Account No. 50-1314.

Respectfully submitted,

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Version with markings to show changes made:

37. (Twice Amended) A manufacturing process for an organic EL element having a stacked structure including a hole injecting and transporting layer and a light-emitting layer formed within a partitioning member which is divided into individual pixel areas, the method comprising:

forming the partitioning member on [a] the substrate, the partitioning member having openings corresponding to pixel areas;

independently filling each of the openings with a composition for the hole injecting and transporting layer using an ink-jet recording head, the composition comprising (1) a conductive material containing at least a lubricant, polyethylene dioxythiophene [polyethylenedioxithiophene] and polystyrene sulfonic acid, and (2) a solvent; and

drying the composition filled in the openings to form the hole injecting and transporting layer.

56. (Twice Amended) A manufacturing process for an organic EL element having a stacked structure including a hole injecting and transporting layer and a light-emitting layer formed within a partitioning member which is divided into individual pixel areas, the method comprising:

forming the partitioning member on [a] the substrate, the partitioning member having openings corresponding to pixel areas;

independently filling each of the openings with a composition for the hole injecting and transporting layer using an ink-jet recording head, the composition comprising at least a material for [a] the hole injecting and transporting layer, a lubricant, and a polar solvent; and

drying the composition filled in the openings to form the hole injecting and transporting layer.

62. (Twice Amended) A method for manufacturing an electroluminescent display, the method comprising:

(1) manufacturing an EL element, wherein the step of manufacturing the EL element comprises:

forming a partitioning member on [a] the substrate, the partitioning member having openings corresponding to pixel areas;

independently filling each of the openings with a composition for a hole injecting and transporting layer using an ink-jet recording head, the composition comprising (a) a conductive material containing at least a lubricant, polyethylene dioxythiophene [polyethylenedioxithiophene] and polystyrene sulfonic acid, and (b) a solvent; and

drying the composition filled in the openings to form the hole injecting and transporting layer; and

(2) incorporating the manufactured EL element into the electroluminescent display.

63. (Twice Amended) A method for manufacturing an electroluminescent display, the method comprising:

(1) manufacturing an EL element, wherein the step of manufacturing the EL element comprises:

forming a partitioning member on [a] the substrate, the partitioning member having openings corresponding to pixel areas;

independently filling each of the openings with a composition for a hole injecting and transporting layer using an ink-jet recording head, the composition comprising at least a material for the hole injecting and transporting layer, a lubricant, and a polar solvent; and

drying the composition filled in the openings to form the hole injecting and transporting layer; and

(2) incorporating the manufactured EL element into the electroluminescent display.